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Contract No. 88-T0211
SDMS # 54743
1652-0751

SUPERFUND STATE CONTRACT

FOR INTERIM REMEDIAL ACTION

AT THE

IRON MOUNTAIN MINE SITE

REDDING, CALIFORNIA

BETWEEN

THE STATE OF CALIFORNIA

AND THE

U.S. ENVIRONMENTAL PROTECTION AGENCY

A. Authority

This Superfund State Contract ("Contract") is executed pursuant to Sections 104(a)(1), (b), (c)(2) and (c)(3) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. §9601 as amended by the Superfund Amendments and Reauthorization Act of 1986, ("CERCLA") and the Hazardous Substances Account Act, California Health and Safety Code (HSC) Sections 25300, et seq., in particular, HSC Section 25351 (a)(2).

B. Purpose

1. This Contract is an agreement between the U.S. Environmental Protection Agency ("EPA") and the State of California (the "State"), acting through the California Department of Health Services ("DOHS"), to undertake interim remedial action at the Iron Mountain Mine site, Redding, California ("the Site").

This Contract covers the Partial Cap component of the interim remedial action. The remedial action for his component consists of 1) construction and construction management as described in the Statement of Work ("SOW) attached as Appendix B and incorporated herein by reference; and 2) Operations and Maintenance (O&M) as described in paragraph B.5 of this Contract.

Subsequent components of the authorized interim remedial action may be covered by amendment to this contract. A statement of work and funding provisions, as agreed to by the parties, will be addressed by way of amendment as set forth in paragraph R, or in a separate contract.

2. Attached as Appendix A, consisting of twelve (12) pages and incorporated herein by reference is a description of the Site and the response actions taken to date by the State and EPA at the Site.

3. Attached as Appendix B, consisting of one (1) page and incorporated herein by reference is the SOW for the construction and construction management of the Partial Cap component of the interim remedial action. A statement of work and funding provisions for the Quality Assurance Period (QAP), as agreed to by the parties, will be addressed by way of amendment, or in a separate agreement, as set forth in subparagraph F.2.

4. EPA, through contractors, agents and/or authorized representatives, is preparing the design for the partial cap component of the interim remedial action. This design must be approved by EPA and DOHS in writing before construction begins on the partial cap. The design, when approved, shall be appended to this Contract as Attachment 1 to Appendix B, and thereupon be deemed to be incorporated into the SOW.

5. When approved by EPA and DOHS, a Final Operations and Maintenance ("O&M") Manual for the Partial Cap will be made a part of this Contract pursuant to paragraph R and thereby incorporated into this Contract as Appendix C. The purpose of this O&M Manual will be to provide guidance regarding future measures necessary to preserve the integrity of response activities for the expected life of the Partial Cap following the completion of work described in the SOW. For all purposes of this Contract, O&M is defined to include all necessary operations, maintenace, and support activities following completion of construction of all facilities as described in the SOW. O&M costs are defined to include the full, direct costs of implementing such activities, including those costs associated with contractual services, contract administration, inspection, monitoring and all other administrative support functions.

6. This Contract will become effective upon its execution by the State and EPA, and will terminate in accordance with Paragraph S. A separate contract or a cooperative agreement regarding other response actions at the Site (i.e. including, but not limited to the design and implementation of recommended remedial measures), may be executed in accordance with the National Oil and Hazardous Substances Contingency Plan ("NCP").

7. CERCLA Section 104(c)(4) requires that CERCLA-funded actions provide a cost-effective response, balancing the need for protection of public health, welfare and the environment against the availability of amounts from the Fund to respond at other sites. If the State requests additional Fund-financed response at the Site, EPA will evaluate the request against available Fund monies to determine whether it is appropriate. This Contract does not commit EPA to future funding for response actions at the Site.

C. Parties

1. This Contract is between EPA and the State.

2. EPA has designated Rick Sugarek, or his appointed successor, EPA Region 9, 215 Fremont Street, San Francisco, California 94105, (415) 974-8230 (FTS: 454-8230), to serve as Regional Project Manager ("RPM") for this Contract.

3. The Department has designated the Senior Engineer, NPL Unit, California Department of Health Services, 4250 Power Inn Road, Sacramento, CA 95826 (916) 920-7703 to serve as State Project Officer ("SPO") for this Contract.

4. The EPA RPM, in consultation with the State Project Officer may make project decisions necessary to successfully meet the objectives of this Contract that do not enlarge the scope of the remedial actions or increase the cost.

D. EPA Responsibilities

1. EPA will pay ninety (90) percent of the cost of the interim remedial action described in the SOW.

2. EPA shall secure the services of contractor(s), authorized representatives, agents, or its employees to perform the work outlined in the SOW. EPA shall, at its own cost and expense, furnish the necessary personnel, materials, services, and facilities to perform its other responsibilities under this Contract. EPA will coordinate activites of other Federal agencies related to the Site.

3. EPA shall not contract to pay more than $5.0 million for the work described in the SOW unless this subparagraph is amended as provided in paragraph R, to provide for a higher limit on expenditures for the work.

4. EPA shall consult with the State on matters relating to the design and the implementation or modification of work listed in the SOW.

5. EPA, through contractors, agents or authorized representatives shall provide the O&M Manual as described in subparagraph B.5.

E. State Responsibilities

1. DOHS responsibilities under this Contract include consulting with EPA, its contractor(s), agents or authorized representatives on the interim remedial action relating to implementation of the SOW, development of the O&M Manual, monitoring EPA's progress reports and providing for the fulfillment of the State's obligations under this Contract.

2. DOHS shall at its own cost and expense furnish the necessary personnel, materials, services, and facilities to perform its responsibilities under this Contract. In the event that the State is awarded separate funding for this Site under an EPA Management Assistance Multi-Site Cooperative Agreement, such monies may be spent by the State to furnish the necessary personnel, materials, services, and facilities to perform its responsibilities under the terms of the Multi-Site Cooperative Agreement.

3. The State shall pay ten (10) percent of the costs of the interim remedial action described in the SOW for the Partial Cap component of the interim remedial action. The State share is currently estimated to be $500,000. Submission of payment to EPA shall be in accordance with Subparagraph H.2.

4. The DOHS State Project Officer, in consultation with the EPA Remedial Project Manager, may make decisions necessary to successfully meet the objectives of the approved O&M Manual throughout the period of the expected life of the interim remedial action, consistent with paragraph F. This consultation shall only be binding upon the State, however, during the Quality Assurance Period as described in subparagraph F.2.

5. DOHS will attempt to obtain necessary O&M funding to fulfill its obligations under this Contract from the California Legislature, consistent with State law and authorities of DOHS. DOHS will promptly inform EPA if the California Legislature fails to appropriate adequate funds to meet the State's O&M responsibilities. All contractual, supervisory, and compliance responsibilities for O&M for the Partial Cap throughout the expected life of the response action will remain the responsibility of DOHS pursuant to subparagraph F.1 once the Quality Assurance Period has terminated.

F. Continued Operations of the Interim Remedial Action

1. Pursuant to CERCLA Section 104(c)(3)(A), the State warrants that it will provide for all future operation and maintenance (O&M) of the Partial Cap provided for under this contract, consistent with the approved O&M Manual, for the expected life of the cap, following completion of work described in the SOW, except as otherwise specified in subparagraph F.2 and paragraph S. Any State commitment to O&M shall be consistent with its lawful authority and as described in subparagraph E.5 of this Contract.

2. EPA shall provide ninety (90) percent of the funding for any and all maintenance activities during the Quality Assurance Period (QAP) for the Partial Cap, consistent with the approved O&M Manual, for a period of time beginning with the date of completion and acceptance by EPA of work described in the SOW and terminating twelve (12) calendar months thereafter. Funding will be provided unless Congress does not appropriate funds or EPA determines that all available funds are required to respond to releases at other sites. The State acknowledges that EPA's capability to cost share for the Quality Assurance Period is also limited to the duration of the Hazardous Substance Response Trust Fund. This QAP cost sharing will require the execution of an amendment of this Contract pursuant to section R or a separate agreement between EPA and DOHS specifically

defining the responsibilities of EPA and DOHS and the terms and conditions for this twelve (12) month period of QAP cost sharing. This amendment or separate agreement will also require execution by both parties and an effective date prior to the completion of work described in the SOW.

G. Site Access and Permits

1. As requested by EPA, the state shall obtain or assist EPA in obtaining any permits that are necessary to implement the interim remedial action.
2. Representatives of the State shall have access to the site to review work in progress. EPA shall not be responsible for any harm to any State representative or other person arising out of, or resulting from, any act or omission by the State in the course of an on-site visit.

H. Payments

1. The State shall pay 10% of the cost of the activities described in the SOW, including change orders and claims agreed to by EPA, as provided in paragraph H.2. below. The current estimate of the total cost of these activities is $5,000,000.

   The State's share of the total cost of the activities described in the SOW shall not exceed ten percent (10%)

of the costs of the activities described in the SOW. The State declares that $500,000 is available for the purpose of this agreement.

2. Payment will be made in the following manner:

   - Within 90 days after signature of this Contract, the State shall submit to EPA its first payment for one-half of the State's share for the site activities: Two hundred fifty thousand dollars ($250,000).

   - Within 60 days of EPA's and the State's acceptance of the completion of the work as described in the SOW, EPA will submit to the State a bill for 10% of the total actual costs of the activities described in the SOW minus the State's initial payment. The bill will include invoices from the contractors performing the interim remedial action activities as described in the SOW and supporting documentation as necessary. The State will pay the amount requested in the bill within 60 days after EPA bills the State if the State determines that the invoices and supporting documentation reflect appropriate expenditures under the contract between EPA and its contractor and under this Contract. The cumulative total of the State payments to EPA under this Contract will not exceed 10% of the total cost of the activities described in the SOW.

3. EPA will use 14 percent of the total cost of the interim remedial action, seven hundred thousand dollars ($700,000), as a construction contingency fund to cover change orders for the partial cap. The EPA Project Manager may approve expenditures from this fund. EPA will inform the State when total contingency fund expenditures exceed 75 percent of the fund. This Contract may be amended to add more money to the project contingency fund, should it be necessary to do so.

4. When the work described in the SOW is complete, final cost and audit information as required in paragraph Q will be provided to the State at the State's request.

5. After final payment by the State under this Contract, EPA's Financial Management Center in the Office of Emergency and Remedial Response will inform EPA's Financial Management Division in the Office of Fiscal and Contracts Management if any overpayment has been made by the State. Any overpayment by the State will be refunded within 90 days after determination of said overpayment or EPA will credit the amount of said overpayment to be used as directed by the State as a credit towards the State's 10% share on other Superfund remedial actions. The State shall determine whether to take a refund or a credit on the overpayment.

6. If the total cost of the activities described in the SOW exceeds $5,000,000, this Contract shall be amended in writing by the parties to provide for any additional funds to be furnished by the State to meet its 10% cost share requirement under CERCLA §104(c)(3).

7. EPA warrants that payments made by the State hereunder shall satisfy the State's ten percent (10%) share obligation for the pro rata cost of the response action for this site in accordance with CERCLA §104(c)(3).

8. The State shall pay 10% of the cost of the 12 calendar months of the Quality Assurance Period for the Partial Cap provided under this Contract. The actual cost to be paid by the State will be defined in an amendment to this Contract or in a separate agreement.

9. All requests from EPA for State payments under this Contract shall be sent to:

California Department of Health Services
Toxic Substances Control Division
Office of Procurements and Contracts
714/744 P Street
Sacramento, California 95814
Attention: Contracts & Grants Administration Unit

10. All State payments to EPA shall be made payable to EPA Hazardous Substance Response Trust Fund and sent to:

Environmental Protection Agency
Superfund
P.O. Box 371003M
Pittsburgh, PA 15251
Attn: Collection Officer for Superfund

I. Emergency Response Action

Any emergency response activities conducted at the Site pursuant to the NCP, 40 CFR §300.65, shall not be restricted by the terms of this Contract. EPA, in consultation with the State, may suspend or modify the activities of the interim remedial action covered under this Contract during and subsequent to such emergency response actions. In the event that any emergency actions change the conditions under which this Contract has been entered, this Contract shall be amended to reflect any new or changed Site conditions, pursuant to paragraph R of this Contract.

J. Community Relations Plan

EPA or its contractors will develop and implement the Community Relations Plan for the SOW. DOHS will provide assistance to EPA in developing and implementing the Community Relations Plan. EPA will provide information related to remedial action activities to interested parties including local, State, and Federal agencies pursuant to the Community Relations Plan.

K. Negation of Agency

Nothing contained in this Contract shall be construed to create, either expressly or by implication, the relationship of agency between EPA and the State. Any standards, procedures or protocols prescribed in this Contract to be followed by EPA or its contractors during the performance of its obligations under this Contract are for assurance of the quality of the final product of the actions contemplated by the Contract, and do not constitute a right to control the actions of the State. EPA (including its employees, agents, authorized representatives and contractors) is not authorized to represent or act on behalf of the State in any matter relating to the subject matter of this Contract, and the State (including its employees, agents, authorized representatives and contractors) is not authorized to represent or act on behalf of EPA in any matter relating to the subject matter of this Contract.

L. Cost Recovery

1. EPA and the State agree that, with respect to the claims which each may be entitled to assert against any third persons (herein referred to as the "responsible party", whether one or more) for reimbursement of any services, materials, monies or other thing of value expended by EPA or the State for response activity at the Site described in this Contract, neither EPA nor the State will enter into a settlement with or initiate judicial or adminis-

trative proceedings against a responsible party for the recovery of such sums except after having given notice in writing to the other party to this Contract not less than thirty (30) days in advance of the date of the proposed settlement or commencement of the proposed judicial or administrative proceedings. Neither party to the Contract shall attempt to negotiate for nor collect reimbursement of any response costs on behalf of the other party, and authority to do so is hereby expressly negated and denied.

This notice condition is strictly limited to cost recovery claims and has no application to any other claims that may be asserted by EPA or the State against a responsible party under federal or State law.

2. EPA and the State agree that they will cooperate in and coordinate efforts to recover their respective costs of response actions taken at the Site described herein, including the negotiation of settlement and the filing and management of any judicial actions against responsible parties. This shall include coordination in the use of evidence and witnesses available to each in the preparation and presentation of any cost recovery action, excepting any documents or information which are confidential under the provisions of any applicable State or Federal law or regulation. Coordination and use of confidential documents and information shall be as provided for in paragraph M of this Contract.

3. EPA and the State agree that judicial action taken by either party against a responsible party for recovery of any sums expended on remedial actions at the Site under the Contract shall be filed in the United States District Court for the judicial district in which the Site is located, or in such other judicial district of the United States district courts as may be authorized by Section 113 of CERCLA, and agreed to in writing by EPA and the State, or, in the case of the State, in State courts of competent jurisdiction, and agreed to in writing by EPA and the State.

4. Any recovery achieved by the State pursuant to settlement, judgment or consent decree or any action against any of the responsible parties, of money expended pursuant to this contract will be shared with EPA in proportion to EPA's contribution to the interim remedial action at the site under CERCLA.

5. Any recovery achieved by EPA pursuant to settlement, judgement or consent decree, or any action against any of the responsible parties, of money expended pursuant to this contract will be shared with the State in proportion to the State's contribution to the interim remedial action at the site under CERCLA.

M. Information on the Site

1. Upon request, and consistent with State law, the State shall make available to EPA all documents and information concerning the Site. If EPA requests records (information or documents) from the State which the State claims as exempt from public disclosure or which are legally privileged, the State will so label and identify such records prior to release to EPA. EPA will treat such records in accordance with 40 CFR Part 2. EPA will not disclose information submitted under a claim of confidentiality unless EPA is required to do so by Federal law and has given the State advance notice of EPA's intent to release that information. Absent notice of such claim of confidentiality, EPA may make said information available to the public without further notice.

2. Upon request, and consistent with Federal law and regulations, EPA shall make available to the State any information and reports developed as part of its responsibilities under this contract. Consistent with State law, the State agrees not to release to the public any information which EPA has provided to the State and which EPA has marked confidential and/or which may potentially affect present or planned enforcement actions unless approved by both EPA's Region 9 Office of Regional Counsel and DOHS's Office of Legal Services.

N. Third Parties

1. This Contract is intended to benefit only the State and EPA. It extends no benefit or right to any third party not a signatory to this Contract.

2. EPA does not assume any liability to third persons with respect to losses due to bodily injury or property damages that exceed the limitations contained in the provisions of 28 U.S.C. Sections 1346(b) and 2671-2680. To the extent permitted by State law, the State does not assume liability to any third parties with respect to losses due to bodily injury or property damage.

O. Responsible Party Clean-up

If EPA and/or the State reach an agreement with any of the responsible parties to undertake all or part of the activities covered under this Contract, this Contract may be revised accordingly.

P. Title

Upon completion of the remedial activities covered under this Contract, title to personal or real property acquired or constructed during the remedial activities vests with the State. The State shall comply with applicable provisions of 40 C.F.R. Part 30 regarding the management and disposition of personal and real property and shall record its title with the County Recorder of Shasta County.

Q. EPA Financial Records

Upon request, EPA shall provide to the State copies of documentation pertaining to costs and work performed by EPA or its agents or authorized representatives in accordance with the SOW within 60 days of completion of tasks described in the SOW.

R. Amendments

Any change in this Contract must be agreed to, in writing, by both parties hereto.

S. Termination of the Contract

This Contract shall remain in effect for five (5) years following completion of the activities described in the SOW, unless terminated by joint written agreement of both parties.

Upon the expiration of the contract term, the state will examine the conditions of the Partial Cap in order to evaluate the provisions of the O&M manual. If circumstances occur that require modification to the O&M manual, then the parties shall enter into a new agreement that will take into account the changed circumstances. If such circumstances do not occur, the state shall continue to comply with the provisions of the O&M manual, in accordance with Paragraph F.

T. Failure to Comply with Terms of Contract

1. If the State fails to comply with the terms of the Contract, EPA may proceed under the provisions of Section 104(d)(2) of CERCLA.

2. If EPA fails to comply with the terms of the Contract, the State may, after providing 60 days notice, seek in the appropriate court of competent jurisdiction, to enforce the Contract.

U. Execution of Agreement

This agreement shall become effective upon execution by the State of California and the United States Environmental Protection Agency. This Agreement has been made and entered into in the State of California, by and between the State of California, through its duly elected or appointed, qualified and acting officials and the EPA.

In witness whereof, the parties hereto have executed this Contract in two (2) copies, each of which shall be deemed an original.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Jeff Zelikson — 5-26-88

Jeff Zelikson — Date

Director

Toxics & Waste Management Division

EPA Region 9

STATE OF CALIFORNIA

C. David Willis — 6/10/88

C. David Willis — Date

Deputy Director

Toxic Substances Control Division

California Department of Health Services

M. A. Philo — 6-10-88

Marvin H. Philo — Date

Chief, Office of Procurements and Contracts

Toxic Substances Control Division

California Department of Health Services

APPENDIX A

IRON MOUNTAIN MINE

REDDING, CALIFORNIA

DESCRIPTION OF SITE AND RESPONSE

ACTIONS TO DATE

I. SITE LOCATION AND DESCRIPTION

The Iron Mountain mine is the southernmost mine in the West Shasta Mining District, an area worked since the Civil War for precious and base (heavy) metals. The mine is located on 4400 acres of land in the southeastern foothills of the Klamath Mountains, about nine miles northwest of the City of Redding, Shasta County, California. The rugged topography at the mine is typical of a mountainous region with precipitous slopes bisected by fast flowing streams. Elevations range from 600 feet along the Sacramento River, several miles east of the mine, to 3,400 feet on top of Iron Mountain. Precipitation in the mine area varies from 50 to 75 inches per year, most of it falling as rain between the months of November and April. Snow accumulation of several inches is common above an elevation of 2,000 feet during the Fall-Winter storms, and usually melts in a few days. Iron Mountain is drained by Boulder Creek to the north and Slickrock Creek to the south (See Figure 1, "Location of Iron Mountain Mine site".). Boulder Creek, a perennial

stream, receives a portion of its flow, containing most of the Acid Mine Drainage (AMD), from two adits/tunnels (the Richmond and Lawson) via their portals. Slickrock Creek is an intermittent stream which also receives seepage from other buried adits and from storm water drainage from the Brick Flat Pit. A rock slide diverted the original Slickrock Creek drainage and buried two other adit (Old Mine and Number 8) portals to a depth of 50 to 200 feet. Slickrock and Boulder Creeks flow southeastward into Spring Creek. Just prior to the confluence of Spring Creek with the Sacramento River (a little above the Keswick Dam) is located the Bureau of Reclamation's Spring Creek Debris Dam and Reservoir, built in 1963, as part of the Central Valley Project.

II. ENVIRONMENTAL PROBLEM

During the final stages of mine operation open-pit mining was employed for the production of pyrite. Prior extensive underground mining was accomplished using conventional methods. Those underground mining methods varied depending upon the condition of the ore and country rock, and the physical layout of the ore bodies. They included top slicing, sub-level caving, and open stope room and pillar mining. Access generally was by adit. The apparent maximum depth of ore mined was relatively shallow, i.e., no greater than 1,000 feet. The end result was some caving and collapsing of the original surface. This condition has provided good accessways for surface and ground waters to come into

contact with unmined pyrite which was then oxidized to form sulfuric acid, and which in turn leached out zinc, cadmium and copper metals in the mineralized zone. The end result has been the production of AMD (with a pH as low as 0.5) flowing out the adits via the portals into Boulder and Slickrock Creeks. This AMD coupled with additional acid formed along surface outcrops is the essence of the environmental problem at Iron Mountain, e.g., highly charged acid water carrying large amounts of leached out heavy metals in solution. Adding to the problem is AMD derived from mineral laden dumps of mine waste rock, smelter slag, and, particularly, mill tailings from the processing operations along which surface waters migrate.

During periods of intense winter rain, high volumes of runoff are produced from the Spring Creek Watershed. This also coincides with a high production of AMD from the Iron Mountain Mine. At these times, releases from Shasta Lake are frequently reduced to maximize storage of water behind Shasta Dam and to prevent flooding of the Sacramento River. When high runoff periodically causes the Spring Creek Reservoir to exceed capacity, uncontrolled spills have occurred. As a result copper, zinc, and cadmium in solution exceeded the lethal levels for fish resulting in large "kills". More frequently, sublethal concentrations occur that have detrimental effects on some aquatic species, including reduced rates of growth, interference with physiological processes

necessary for successful migration, and inhibition of gill function, leading to significantly reduced productivitiy.

Investigations in the Iron Mountain Mine area have documented the following environmental conditions which now exist and will continue as a result of the toxic effects of the AMD from Iron Mountain Mine:

1. Heavy metal contamination of Boulder Creek, Slickrock Creek, Flat Creek, and portions of Spring Creek, causing the elimination of aquatic life and all other beneficial uses of these watercourses downstream of Iron Mountain Mine.

2. Heavy metal contamination of Keswick Reservoir, causing periodic fish kills and a significant reduction in fish and aquatic invertebrates and unsightly deposits of metallic sludges in the lower one and one-half miles of the Reservoir downstream of Spring Creek. This contamination has reduced, if not eliminated, recreational uses of the lower Reservoir.

3. Periodic fish kills in Keswick Reservoir and in the Sacramento River downstream of Keswick Dam caused by uncontrolled spills of contaminated water from Spring Creek Reservoir. In addition, there are repeated instances when the LC50 levels for juvenile salmon and steelhead in the Sacramento River below Keswick Dam are exceeded. These instances are caused by

uncontrolled spills at Spring Creek Reservoir. In addition, shortterm exposure (6-8 hours) to high concentrations of heavy metals occurs below Keswick Dam from normal water releases at Spring Creek Reservoir during the Spring Creek powerhouse start-up.

4. Accumulation of copper and cadmium in the tissue of resident fish below Keswick Dam at levels which greatly exceed the statewide norm and which suggest adverse reproductive and other physiological impacts. In the case of cadmium, the levels in fish tissue below Keswick Dam are over five times the statewide norm.

5. Temporary discontinuation of domestic water from the Sacramento River for precautionary reasons during uncontrolled spill events at Spring Creek Reservoir.

6. Occasional loss of large volumes of fresh water in storage when the U.S. Burea of Reclamation has had to release water from Shasta Dam to dilute high concentrations of heavy metals spilling from Spring Creek Reservoir.

III. RESPONSE ACTIONS

Several actions have been taken that have had an effect on the incidence and severity of AMD problems at Iron Mountain Mine. These measures, although lessening the pollution problems somewhat, have not been successful in eliminating impacts.

1. Copper Cementation Plants

   In 1940, Mountain Copper Company, Ltd., constructed a copper cementation plant to recover copper from mine drainage in the Boulder Creek drainage area. In the cementation process, scrap iron is contacted with the AMD resulting in the precipitation of copper and dissolution of the scrap iron.

2. Spring Creek Debris Dam

   The SCDD was constructed in part to help prevent toxic concentrations of metals and consequent fishkills as a result of discharges of AMD to Keswick Resevoir. The operations objective is to release AMD from SCDD at a rate which will result in safe metal concentrations below Keswick Dam. The debris dam has not been entirely effective in achieving this objective, particularly during periods of high precipitation which can produce runoff that exceeds storage capacity of SCDD. This results in uncontrolled spills of AMD. When Sacramento River base-flow is being stored at the same time to conserve water in Shasta Lake or to minimize downstream flooding, these acid metal-laden flows from SCDD are not diluted sufficiently to prevent fishkills, especially in the early life stages of fish.

In 1980, a Memorandum of Understanding (MOU) was developed between the State Water Resources Control Board (SWRCB), U.S. Burea of Reclamation (USBR), and the California Department of Fish and Game (CDFG) for the purpose of minimizing the Spring Creek toxicity problem.

As part of this MOU, the USBR agreed to operate the Spring Creek Debris Dam and Shasta Dam water management system in such a manner that, to the extent possible, sufficient dilution water would be available to ensure that State water quality criteria below Keswick Dam would be met.

Also, under the agreement, the CDFG conducted fish toxicity tests to provide a basis for permanent toxicity criteria release schedules, and water quality objectives. After two years of intensive laboratory and field work, the CDFG identified the following levels of metals below which protect all life stages of andromous salmon and steelhead below Keswick Dam: Copper (5.6 ug/l); zinc (16.0 ug/l); and cadmium (0.22 ug/l). These recommended levels were adopted by the Regional Water Quality Control Board as Basin Plan objectives for the Keswick Dam area and approved by the State Water Resources Control Board (SWRCB) in August 1984. These objectives were approved by EPA on August 7, 1985 under Section 303 of the Clean Water Act.

IV. EPA INVOLVEMENT

In June 1981, the State of California submitted the Iron Mountain Mine site as a candidate for the Interim Priorities List (IPL). When the IPL was released in October 1981, Iron Mountain Mine appeared in the fourth decade of candidate sites. Later, on August 31, 1982, the state submitted Iron Mountain Mine as a candidate for the National Priorities List (NPL). On December 30, 1982, EPA proposed the Iron Mountain Mine Site for inclusion on the NPL. On September 8, 1983, through final rule-making, the site was included on the NPL.

In September 1983, EPA commenced a Remedial Investigation and Feasibility Study (RI/FS). The purpose of the RI was to assess the major sources of contamination leaving the site and collect data needed to identify and evaluate potential remedies. During the FS, potential remedies were evaluated according to technical, environmental, public health, institutional, and cost criteria.

EPA's RI found that the following five major sources account for approximately 72 percent of the copper and 86 percent of both zinc and cadmium being discharged from the site during the sampling period.

Richmond Portal: This source is a mine adit into the Richmond orebody which represents the major single source of AMD at Iron Mountain Mine. The Richmond orebody has been extensively

mined, resulting in subsidence pits and closed drainages on the surface overlying the zone. Water which drains from the Richmond portal results from infiltration of surface water captured in the closed drainage areas overlying the orebody and by lateral inflow of groundwater from areas upgradient of the mine.

Lawson Portal: This source is a mine shaft located on Boulder Creek immediately below and to the east of the Richmond portal.

Old No.8 Mine Seep: This source is located on the upper end of Slickrock Creek and is believed to originate from either the No.8 Mine and/or the Old Mine. The entryways for these mines were covered by a slide in the 1950's.

Big Seep (below Okosh Mine): This source is made up of seeps which discharge from the waste rock dump on the south side of Slickrock Creek.

Brick Flat Pit By-Pass: Water that is discharged from this source originates from the drainage area into Brick Flat Pit and is carried outside the pit by an earthen dam.

The major objective of the feasibility study was to evaluate remedial alternatives using a cost-effective approach consistent with the goals and objectives of CERCLA. A cost-effective remedial alternative is defined in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) 40

C.F.R. §300, et seq., as the alternative that effectively mitigates and minimizes threats to and provides adequate protection of public health and welfare and the environment. Except as provided in Section 300.68(i)(5), this requires the selection of a remedy that attains or exceeds applicable or relevant and appropriate federal public health and enironmental requirements that have been identified for the specific site. In selecting the appropriate extent of remedy, EPA is directed to consider cost, technology, reliability, administrative and other concerns, and their relevant effects on public health and welfare and the environment.

The feasibility study process included the following steps: (1) identification of general response actions, (2) identification of target clean-up levels, (3) assembly of the universe of technologies relevant to the response actions, (4) retention of the surviving technologies as component actions, (5) assembly of the component actions into combined alternatives, (6) initial screening of the combined alternatives, and (7) detailed analysis of surviving combined alternatives. Nine combined alternatives (CA-1 to CA-9) underwent very detailed analysis. Three alternatives were considered in less detail and were included in the final alternatives matrix: Alternatives CA-10 ($1.4 billion), CA 11 ($350 million) and CA-12 ($263 million).

On October 3, 1986 EPA signed its Record of Decision (ROD) for the Interim Remedial Action at Iron Mountain Mine. Considering Fund Balancing, EPA selected alternative CA-9 as the alternative which most closely approaches the requirements, balancing the need to conserve monies in the Fund for addressing clean-up at other sites. CA-9 involves an innovative technology which is not proven. Therefore, the ROD authorized certain interim remedial action for implementation at this time to begin lessening the impacts of the AMD on aquatic life and also authorized additional studies to prove the suitability of the innovative technique involving the use of a Low Density Cellular Concrete (LDCC) to eliminate or reduce the AMD formation reaction. If a source control technique is unsucessful based on demonstration and/or hydrological studies, the ROD relies then on CA-8 which involves lime neutralization treatment in addition to the interim remedial actions.

The interim actions include components for water management, source control and limiting site access. The source control component is to establish a partial cap on Iron Mountain (specifically on cracked and caved ground areas and in Brick Flats Pit) to eliminate known rapid infiltration routes of rain and surface water to the mineralized zones. In addition a network of ditches will be established to collect and direct surface flow away from access routes. The water management components include diversions of clean

surface water away from contamination at the site and to also allow for more storage capacity of contaminated waters behind the Spring Creek Debris Dam. The diversions include:

- Upper Spring Creek to Flat Creek
- South Fork of Spring Creek to Rock Creek
- Slickrock Creek around the Debris slide.

Futhermore, the ROD authorizes the enlargement of the Spring Creek Debris Dam.

APPENDIX B

STATEMENT OF WORK

Description: Construction and construction management for the interim remedial action at the Iron Mountain Mine Site, Redding, California.

Tasks	Level of effort Hours	Estimated Cost
Partial Cap		
° Construction Management	3200	$400,000
° Installation of caps above Richmond mineralized zone in accordance with design specifications to be established in accordance with Paragraph B.4 of this contract.		$4.6 Million
Estimated Total:	$5.0 Million	
Estimated Time to Complete:	6-9 calendar months	